

Claims

What is claimed is:

1. A system for purging and disinfecting residual water from the whirlpool plumbing of a whirlpool bath, comprising:
 - a bathtub;
 - a primary water inlet in hydraulic communication with the bathtub;
 - a primary water outlet in hydraulic communication with the bathtub;
 - an auxiliary water outlet in hydraulic communication with the bathtub and positioned to define a maximum water level;
 - a hydraulic pump having a water outlet port and a water inlet port;
 - an air pump having an air inlet port and an air outlet port;
 - at least one suction fitting formed in the bathtub;
 - at least one hydraulic suction conduit extending between the at least one suction fitting to the water inlet port and connecting the at least one suction fitting in hydraulic communication to the water inlet port;
 - at least one jet nozzle formed in the bathtub;
 - a water manifold substantially positioned above the maximum water level;

19

a water manifold conduit extending between the water outlet port and the water manifold and connecting the water outlet port to the water manifold in hydraulic communication therewith;

at least one water delivery conduit extending between the water manifold and the at least one jet nozzle and connecting the water manifold to the at least one jet nozzle in hydraulic communication therewith;

an air manifold positioned above the water manifold;

an air pump delivery conduit extending between the air pump outlet and the air manifold and connecting the air pump outlet in pneumatic communication with the air manifold;

an ozone supply in pneumatic communication with the air pump;

at least one air nozzle conduit extending between the air manifold and the at least one jet nozzle and connecting the air manifold in pneumatic communication to the at least one jet nozzle;

at least one air suction conduit extending between the air manifold and the at least one suction fitting and connecting the air manifold in pneumatic communication to the at least one suction fitting;

wherein when the bathtub is substantially filled with water and the hydraulic pump is actuated to produce water jets from the at least one jet nozzle, the air pump may be actuated to introduce air into the water jets to soften the water jets;

wherein when the bathtub is substantially drained, the air pump may be actuated to introduce air into the at least one jet nozzle, the at least one suction fitting, the water manifold, the at least one water delivery conduit, and the at least one hydraulic suction conduit to purge residual water therefrom.

2. The system of claim 1 further including a first check valve connected in fluid communication between the air manifold and the at least one jet and a second check valve connected in fluid communication between the air manifold and the at least one hydraulic suction conduit.

3. The system of claim 1 further including a sensor positioned to detect when the bathtub has been drained after use and adapted to send a signal when the bathtub has been drained after use; and an electronic controller operationally connected to the sensor, to the air pump and to the ozone generator; wherein the electronic controller is adapted to actuate the air pump and the ozone generator for a predetermined period of time upon receiving the signal from the sensor.

4. The system of claim 1 wherein the ozone generator is pneumatically connected to the air pump inlet.

5. The system of claim 1 wherein the ozone generator is pneumatically connected between the air pump and the air manifold.

6. The system of claim 1 further including at least one moisture sensor positioned in the at least one hydraulic suction conduit and adapted to send a signal when ambient moisture is above a predetermined level; wherein the sensor is operationally connected to the air pump; and wherein the air pump is adapted to remain actuated for the duration of receipt of the signal.

7. The system of claim 1 wherein the air pump is adapted to selectively blow heated and unheated air.

8. The system of claim 6 wherein when the bathtub is drained, the air pump is adapted to blow heated, ozonated air through the at least one jet nozzle, the at least one suction fitting, the water manifold, the at least one water delivery conduit, and the at least one hydraulic suction conduit until they are substantially dry.

9. The system of claim 1 further including a plurality of check valves connected between the air pump outlet and the air manifold and an electronic controller operationally connected to the respective check valves, wherein the electronic controller is adapted to selectively actuate the respective check valves.

10. A whirlpool system, comprising;

a water pump for circulating water in a whirlpool tub;

a hydraulic plumbing system in hydraulic communication with the water pump, the hydraulic plumbing system comprising:

at least one jet outlet nozzle;

at least one suction inlet fitting;

a first hydraulic plumbing subsystem connecting the at least one suction inlet fitting to the water pump; and

a second hydraulic subsystem connecting the water pump to the at least one jet outlet nozzle;

an air manifold positioned adjacent the hydraulic plumbing system;

an air pump adapted to provide positive air pressure to the hydraulic plumbing system connected in fluid communication with the hydraulic plumbing system;

an ozone source connected in fluid communication with the air pump and the air manifold; and

a at least one air suction conduit extending ^{between} ~~from~~ the air manifold and ~~connecting between the at least one suction inlet fitting and the water pump to connect~~ ^{connecting} the air manifold in pneumatic communication to the ^{a2} ~~at least one suction inlet fitting~~; and

wherein the air pump can be actuated to blow ozonated air through the at least one jet outlet nozzle, the at least one suction inlet fitting, and the first and second hydraulic subsystems.

23

11. The whirlpool system of claim 10 wherein actuation of the air pump to purge standing water from the hydraulic plumbing system acts to substantially dry the system.

a 12. The whirlpool system of claim ~~10~~¹⁰ further including a plurality of check valves operationally coupling the air pump to the hydraulic plumbing system to allow ozonated air to flow from the ozone source into the hydraulic plumbing system and to prevent water from flowing from the hydraulic plumbing system to the air pump.

13. The whirlpool system of claim 12 further including an electronic controller operationally connected to the plurality of check valves and to the ozone source, wherein the electronic controller is adapted to selectively actuate the ozone source and wherein the electronic controller is adapted to selectively actuate the respective check valves.

14. A whirlpool system, comprising;
a bathtub;
a plurality of jet bodies mounted in the bathtub;
hydraulic means for circulating water through the plurality
of jet bodies; and
pneumatic means for circulating ozonated air through the
hydraulic means;
wherein the pneumatic means can be actuated to blow ozone
through the plurality of jet bodies; and
wherein the pneumatic means can be actuated to
substantially purge standing water from the hydraulic means.

a 15. The whirlpool system of claim ^{21/14}~~14~~ wherein the bathtub has an
inner surface and wherein the bathtub is shaped to direct ozone blown
from the plurality of jet bodies substantially over the inner surface.

21¹⁴
a 16. The whirlpool system of claim ~~14~~¹⁴ wherein ~~the pneumatic~~
a ~~means includes:~~
a ~~a pneumatic pump in pneumatic communication with the~~
a ~~hydraulic means and in pneumatic communication with the plurality of jet~~
a ~~bodies;~~
a ~~an ozone generator in pneumatic communication with the~~
a ~~pneumatic pump; and~~
an electronic controller operationally connected to the
a ~~pneumatic~~^{air} pump and to the ozone generator;
wherein the electronic controller is adapted to selectively
a ~~actuate the pneumatic~~^{air} pump and the ozone generator.

14
21, further
a 17. The whirlpool system of claim ~~16~~¹⁴ wherein ~~the pneumatic~~
~~means~~ includes an air heater in pneumatic communication with the
a ~~pneumatic~~^{air} pump, wherein the air heater is electrically connected to the
electronic controller, and wherein the electronic controller is adapted to
selectively actuate the air heater.

18. A whirlpool system, comprising;
a bathtub;
a plurality of water jet nozzles mounted in the bathtub;
hydraulic means for circulating water through the plurality
of water jet nozzles; and
pneumatic means for circulating air through the hydraulic
means;
wherein the pneumatic means can be actuated to blow air
through the plurality of water jet nozzles; and
wherein the pneumatic means can be actuated to
substantially purge standing water from the hydraulic means.

19. The whirlpool system of claim 18 wherein the pneumatic
means includes:
a pneumatic pump pneumatically connected to the hydraulic
means and pneumatically connected to the plurality of water jet nozzles;
an ozone generator pneumatically connected to the
pneumatic pump;
a heater pneumatically connected to the pneumatic pump;
and
an electronic controller operationally connected to the
pneumatic pump, the heater and to the ozone generator;
wherein the electronic controller is adapted to selectively
actuate the heater, the pneumatic pump and the ozone generator.

20. A whirlpool system, comprising;
a bathtub;
a plurality of air inlets mounted in the bathtub;
hydraulic means for circulating water through the bathtub;
and
pneumatic means for circulating ozonated air through the
plurality of air inlets;
wherein the pneumatic means can be actuated to blow ozone
through the plurality of air inlets.

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21. ¹⁴ A whirlpool system, comprising;

a water pump for circulating water in a whirlpool tub;

a hydraulic plumbing system in hydraulic communication with the water pump, the hydraulic plumbing system comprising:

at least one jet outlet nozzle;

at least one suction inlet fitting;

a first hydraulic plumbing subsystem connecting the at least one suction inlet fitting to the water pump; and

a second hydraulic subsystem connecting the water pump to the at least one jet outlet nozzle;

an air manifold positioned adjacent the hydraulic plumbing system;

an air pump adapted to blow air substantially through the hydraulic plumbing system connected in fluid communication with the hydraulic plumbing system; and

^{INS. a3} ^{a3} at least one air suction conduit extending ^{between} ~~from~~ the air manifold and ~~connecting between the at least one suction inlet fitting and~~ ^{a4} ^{connecting} ~~the water pump to connect~~ the air manifold in pneumatic communication ^{a5} ^{a5} to the ~~at least one suction inlet fitting.~~